Stat 60: Introduction to Statistics.

Teaching team

	Email@stanford.edu	Role	Q&A sessions	Where
Olga Dekhtyar		**Instructor**	**MWF 10:30- 11:50**	**200-203**
		TA		
		TA		
		TA		
		TA		

Lecture: MWF: 10:30-11:50 in 200- 203

Discussions with TA:
> T/R: 9:30-10:20 in ART-360
> T/R: 10:30-11:20 in 160-125
> T/R : 4:30-5:20 in 160-120

Course Overview and Objectives

This is the first course in Statistics. The objective of the course is for students to gain a good intuitive understanding of statistical principles and methods. At the end of the course, students should be able to use elementary statistical techniques and to critically assess statistical work done by others. Topics covered include basic probability, data visualization, summary statistics, sampling, confidence intervals and statistical tests, and regression and prediction. The only prerequisite is algebra, at the high-school level. No prior knowledge of calculus will be assumed.

Statistics isn't just about staring at confusing charts and feeling like you're lost in a number jungle. It's more like tackling a brain-teasing puzzle – the kind that makes you go, "Aha!" when you finally crack it. In Stat60, we're not just crunching numbers; we're detectives on the hunt for the juicy stories hidden within data. Ever noticed how life seems to have a sneaky way of repeating itself? That's where statistics swoops in, revealing patterns and connections you never knew existed. We'll dive into the wild world of probability, where we'll learn just how likely it is for stuff to go down. And trust me, once you've got these skills down, you'll start seeing patterns everywhere – in your grades, in the prices at the grocery store, heck, maybe even in your cat's nap schedule. So get ready to embark on the adventure of Introduction to Statistics – it's not just a subject, it's your ticket to becoming a real-life Sherlock Holmes of numbers.

Learning Goals

1. To introduce you to the basic concepts, terminology and procedures of data analysis, as well as to the logic underlying those procedures.
2. To understand how to calculate basic descriptive and inferential statistics and interpret them.
3. To acquire statistical literacy and be able to determine when, why, and how various statistical tests are used.
4. To learn a statistical software package to perform analyses of quantitative data.
5. To foster the ability to think **critically about scientific and media reports of research findings based on quantitative data.**

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Textbook and References

- Our main reference will be the handouts, which will be made available on Canvas.
- Some useful, but not required, additional reading is:
  - Book: Statistics 3rd or 4 th edition, by Freedman, Pisani and Purves.
  - Introduction to Statistics and Data Analysis, 7th edition, by Roxy Peck and Chris Olsen
  - Statistical Thinking for the 21st Century, by Russell Poldrack. This textbook is free online: (https://statsthinking21.github.io/statsthinking21-core-site/)
  -
- **Kahoot!!! - for fun and practice!!**
- Access to JMP software (instructions how to download on Canvas)

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Course webpage

The online course-management **Canvas** will be used in this course, grades, course announcements and weekly homework assignments will be updated here. Detailed weekly course schedule will be updated at my course webpage Stat 60.

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Statistical Package

We will be using the *JMP 17/18* software packages for data analysis and exploration. You will be given instructions for how to use JMP as needed for this course. Instructions for the download will be posted on Canvas page.

Course Schedule and Logistics

Our weekly schedule is:

- **Lectures:** Monday, Wednesday, Friday: 10:30-11:50 AM in 200-203 .
- **Three problem solving sessions (need to sign up for one!)**:
    - Tuesday and Thursday. 9:30-10:20 am in **ART-360 ;**
    - Tuesday and Thursday. 10:30-11:20am in **160-125** ;
    - Tuesday and Thursday. 4:30- 5:20 pm in**160-120;**

Office hours:

- **Olga**: Monday, Wednesday, Friday**:** 12- 1 pm
- **TAs:**
    - TBD

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Course Information

In-class activities and homework (15%): There will be several in-class activities each week and one homework will be assigned weekly.

- For each of these activities you will work either individually or with a group of size 2-3 (submitting one solution).
- In class activities will be due by next class.
- Homework will be assigned on **Wednesday** and will be due Wednesday next week **by 11:59 pm** .

Quizzes (13%): There will be several on-line and in class quizzes assigned during the quarter.

- The purpose of the online quizzes is preparation. One and half hours of lecture in this class can feel overwhelming if you get lost, so it's important that you do the reading before class. Previous students told me that having these quizzes helps to give them the incentive they need to come to class prepared and avoid getting lost. Quizzes are short, relatively easy, and due 15 minutes before lecture. They are graded for correctness, not just completion. **Late quizzes will not be accepted**, but the lowest three scores will be dropped.
- In class quizzes will sometimes be individual, and sometimes team quizzes or Kahoot quizzes.
- Each quiz will take 10-15 minutes to complete.
- **Late quizzes will not be accepted**, but the lowest three scores will be dropped.

Midterm and Final: There will be **two midterms (15% and 20%)** and **one comprehensive final (35%)**. Dates will be announced at least one week in advance; a rough indication can be found in the schedule below. Policies concerning the use of books and other materials on the exam will be announced prior to each exam.

Absences and Make-ups: If you know that you will miss an exam, or if something unexpected comes up (emergency, illness, etc.) please let me (instructor) know as soon as possible **prior** to the exam, and we will discuss your situation and possibly schedule a make-up.

Grading: **Activities/Homework: 15%;**   **Quizzes: 13%;**

             Midterms: 35% (M1 15%, M2: 20%);   **Final: 35%**   **Participation: 2%;**

Participation: 2%-☺ . I regard **"participation"** as engagement in discussion but also preparedness and classroom etiquette. Grading participation is difficult because it is a subjective practice--to a certain degree. But also I believe that grading class participation can send positive signals to students about the kind of learning and thinking an instructor values, such as growth

in critical thinking, active learning, development of listening and speaking skills needed for career success, and the ability to join a discipline's conversation. That's why I emphasize class participation. Moreover, research reveals that students with a high grade orientation value only those portions of a course that are visibly graded (Marrano and others, 1988. p. 137; Janzow and Eison, 1990). I believe that when students see that their participation is being graded regularly and consistently, they adjust their study habits accordingly to be prepared. (!!!)

We will be using student engagement system **Kahoot** in class. **Kahoot** is a **free** software which allows to ask multiple-choice questions during class to gauge your understanding and harness your attention.

Your homework/lab activities, quizzes, exams and participation will be combined according to the percentages shown above.

Letter grades: 90%-100% =A- to A; 80%-89.99%=B- to B+; 70%-79.99% = C- to C+;   60%- 69.99%=D- to D+;

Students with Documented Disabilities

Students who may need an academic accommodation based on the impact of a disability must initiate the request with the Office of Accessible Education (OAE). Professional staff will evaluate the request with required documentation, recommend reasonable accommodations, and prepare an Accommodation Letter for faculty dated in the current quarter in which the request is being made. Students should contact the OAE as soon as possible since timely notice is needed to coordinate accommodations. The OAE is located at 563 Salvatierra Walk (phone: 723-1066, online at http://oae.stanford.edu)

Stanford University Honor Code

The Stanford University Honor Code is a part of this course. It is Stanford's statement on academic integrity first written by Stanford students in 1921. It articulates university expectations of students and faculty in establishing and maintaining the highest standards in academic work. It is agreed to by every student who enrolls and by every instructor who accepts appointments at Stanford. The Honor Code states:

1. The Honor Code is an undertaking of the students, individually and collectively
   1. that they will not give or receive aid in examinations; that they will not give or receive unpermitted aid in class work, in the preparation of reports, or in any other work that is to be used by the instructor as the basis of grading;
   2. that they will do their share and take an active part in seeing to it and that others as well as themselves uphold the spirit and letter of the Honor Code.
2. The faculty on its part manifests its confidence in the honor of its own students by refraining from proctoring examinations and from taking unusual and unreasonable precautions to prevent the forms of dishonesty mentioned above. The faculty will also avoid, as far as practicable, academic procedures that create temptations to violate the Honor Code.
3. While the faculty alone has the right and obligation to set academic requirements, the students and faculty will work together to establish optimal conditions for honorable academic work.

Penalties for violation of the Honor Code can be serious (e.g., suspension, and even expulsion).
So re-read the Honor Code, understand it, and abide by it.

AI-generated Code and Content

Use of Artificial Intelligence (AI) in Assignments

Students enrolled in STAT 60 are permitted to utilize Artificial Intelligence (AI) tools to generate ideas for assignments and to obtain answers related to lecture content. However, it is imperative that all generated content is accompanied by appropriate citations.

Cautionary Note on AI Reliability

While AI tools may aid in idea generation, it is essential to recognize their limitations. Outputs produced by AI may not always be trustworthy and could potentially be deceptive. Therefore, it is incumbent upon students to verify and validate the results independently.

Cheating and Plagiarism Policy

Any form of cheating or plagiarism facilitated by the use of AI tools will be considered a violation of academic integrity and will be referred to the University Senate for appropriate action.

Responsible Use of AI

- <u>Cite Sources:</u> Ensure that all content generated by AI is properly cited, acknowledging the tool's contribution to the idea generation process.
- <u>Verify Results:</u> Independently verify and cross-check the results obtained from AI tools to ensure accuracy and reliability.

Consequences of Academic Misconduct

Cheating and plagiarism, whether **<u>with or without the use of AI</u>**, are serious offenses that undermine the integrity of the academic community. Students found engaging in such misconduct will face disciplinary action as per University policies.

Commitment to Academic Integrity

By enrolling in STAT60, students acknowledge their commitment to upholding the principles of academic integrity and pledge to utilize AI tools responsibly and ethically.

Note: This policy is subject to review and amendment as deemed necessary to maintain the integrity of the course and align with University regulations.

Classroom Culture

The textbooks will serve as a guide but I expect to supplement the material in the textbook extensively. It will be important for you to come to class, to participate fully, to ask questions, and to be responsible for all course handouts. This will allow us to focus more on the interpretation and presentation of statistical analyses. I cannot overemphasize the importance for you to follow along with the reading assignments and to ask questions of me for any components that are not clear. I hope to create a collaborative learning environment, where you feel comfortable asking questions and working together. Still, I do ask that when I am lecturing that you give me your complete and undivided (or at least silent) attention and that you are respectful of me and your classmates.

Finally:

- This stuff is *'do-able'*!- 😊 But you will need to gain adequate practice by following the lectures and reviewing lab/homework assignments.
- *Please* feel free to ask questions during class! If you're having trouble – there's no need to silently suffer alone
- Take advantage of office hours if you ever have questions about homework and/or the lecture material.

<u>I genuinely want everyone to succeed in this class. If you encounter difficulties during the course, don't hesitate to discuss them with me (preferably before they get out of hand). Work hard this quarter!</u>

Tentative Schedule[*]

	Dates	Topics	Textbook	Supplemental Materials Roxy Peck	Assignments
1	06/23	Introduction to Stat60 /What is statistics.	Ch:1-2	Ch:1-2	
	06/25	Working with data: Categorical vs Quantitative			**HW#1**
	06/27	Summarizing /Visualizing Data	Ch:3	Ch:3	
2	06/30	Exploring Quantitative Data	Ch:4	Ch:4	
	07/02	Probability and Probability Rules	Ch13: 14	Ch:6.1-6.3,6.5	**HW#2**
	07/04	Conditional Probability		Ch:6.4	
3	07/07	Fitting models (central tendency)	Ch:5	Ch:7	
	07/9	Fitting models (central tendency)			**HW#3**
	07/11	**Midterm#1**[*]			
4	07/14	Sampling	Ch: 19-20	Ch: 8	
	07/16	Confidence Intervals	Ch: 21	Ch:9	**HW#4**
	07/18	Confidence Intervals (continued)			
5	07/21	Hypothesis Testing Introduction	Ch 26	Ch: 10	
	07/23	Hypothesis Testing Introduction			**HW#5**
	07/25	Hypothesis test for the mean	Ch 27	Ch:10	
6	07/28	**Midterm#2***			
	07/30	Comparing Means: one-sample t-test (paired)	Ch 27	Ch:11	**HW#6**
	08/01	Comparing Means: two sample t-test	Ch:27	Ch:11	
7	08/04	Modeling Continuous Data: Correlation and Regression	Ch:8- 12	Ch:5 and Ch:13	
	08/06				**HW#7**
	08/08				
8	08/11	Modeling Categorical data	Ch 28	Ch:12	
	08/13	Review for Final			
	08/15	**Final**			

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[*] This schedule is tentative and could be changed at any time during the quarter.